Internal Border Gateway Protocol

(IBGP)



By, Liam Gilmartin

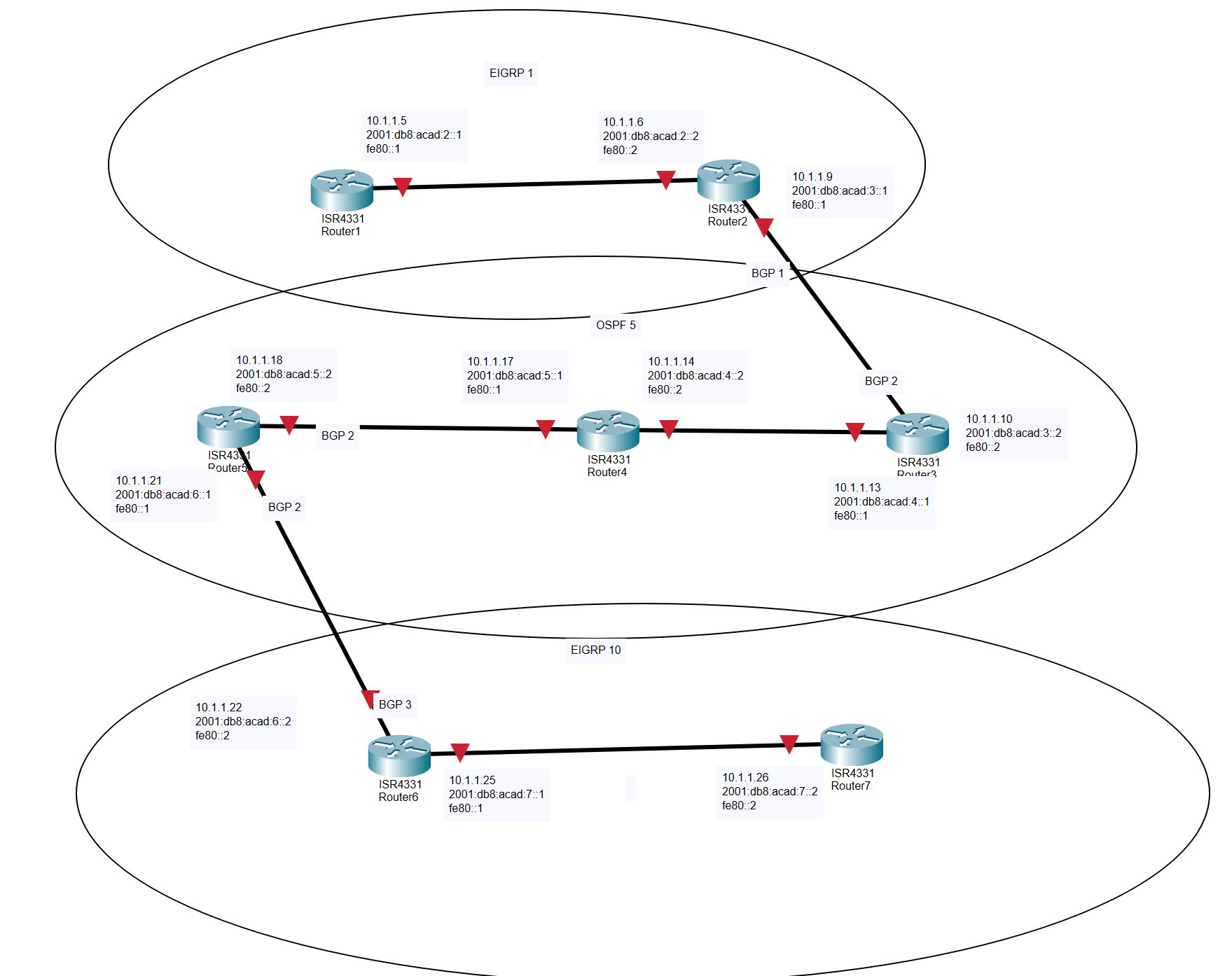
Purpose – The purpose of this lab was to learn how to use BGP within an autonomous system and provide selected information to our internal routers.

Background Information On Lab Concepts – IBGP is used to route in between domains, meaning that overall IBGP is really just BGP however its used in between domains instead of within them. IBGP uses a full mesh topology meaning that the routers cannot learn prefixes from each other and the routes will end up in a routing table from a few different methods.

Lab Summary – In this lab we set up IBGP configs on seven routers, so they were fully connected with an organized IP scheme and correct interfaces.

Lab Commands –

neighbor [ip address] next-hop-self

Network Diagram With IP’s – 

Configurations –

hostname R1

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO21400XZX

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

no ip address

interface GigabitEthernet0/0/0

ip address 10.1.1.5 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:2::1/64

ipv6 eigrp 1

interface GigabitEthernet0/0/1

ip address 10.1.1.2 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:1::2/64

ipv6 eigrp 1

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router eigrp 1

network 10.1.1.0 0.0.0.3

network 10.1.1.4 0.0.0.3

eigrp router-id 1.1.1.1

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 1

eigrp router-id 1.1.1.1

redistribute bgp 1 metric 10000 100 255 1 1500

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

C 10.1.1.4/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.5/32 is directly connected, GigabitEthernet0/0/0

D 10.1.1.8/30 [90/3072] via 10.1.1.6, 00:53:24, GigabitEthernet0/0/0

D EX 10.1.1.12/30

[170/281856] via 10.1.1.6, 00:52:14, GigabitEthernet0/0/0

D EX 10.1.1.16/30

[170/281856] via 10.1.1.6, 00:47:48, GigabitEthernet0/0/0

D EX 10.1.1.20/30

[170/281856] via 10.1.1.6, 00:44:14, GigabitEthernet0/0/0

D EX 10.1.1.24/30

[170/281856] via 10.1.1.6, 00:42:42, GigabitEthernet0/0/0

IPv6 Routing Table - default - 7 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

C 2001:DB8:ACAD:2::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:2::1/128 [0/0]

via GigabitEthernet0/0/0, receive

EX 2001:DB8:ACAD:4::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:5::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:6::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:7::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

hostname R2

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO21491FHX

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface GigabitEthernet0/0/0

ip address 10.1.1.9 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:3::1/64

interface GigabitEthernet0/0/1

ip address 10.1.1.6 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:2::2/64

ipv6 eigrp 1

interface GigabitEthernet0/1/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/1/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router eigrp 1

network 10.1.1.4 0.0.0.3

network 10.1.1.8 0.0.0.3

redistribute bgp 1 metric 10000 100 255 1 1500

eigrp router-id 2.2.2.2

router bgp 1

bgp router-id 2.2.2.2

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.10 remote-as 2

neighbor 2001:DB8:ACAD:3::2 remote-as 2

address-family ipv4

network 10.1.1.8

redistribute eigrp 1

neighbor 10.1.1.10 activate

exit-address-family

address-family ipv6

redistribute eigrp 1

network 2001:DB8:ACAD:2::/64

network 2001:DB8:ACAD:3::/64

neighbor 2001:DB8:ACAD:3::2 activate

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 1

eigrp router-id 2.2.2.2

redistribute bgp 1 metric 10000 100 255 1 1500

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

C 10.1.1.4/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.6/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.8/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.9/32 is directly connected, GigabitEthernet0/0/0

B 10.1.1.12/30 [20/0] via 10.1.1.10, 00:55:36

B 10.1.1.16/30 [20/2] via 10.1.1.10, 00:50:39

B 10.1.1.20/30 [20/3] via 10.1.1.10, 00:47:06

B 10.1.1.24/30 [20/0] via 10.1.1.10, 00:46:05

IPv6 Routing Table - default - 9 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

C 2001:DB8:ACAD:2::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:2::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:3::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:3::1/128 [0/0]

via GigabitEthernet0/0/0, receive

B 2001:DB8:ACAD:4::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:5::/64 [20/2]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:6::/64 [20/3]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:7::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

hostname R3

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

vtp domain cisco

vtp mode transparent

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO214421CU

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface GigabitEthernet0/0/0

ip address 10.1.1.13 255.255.255.252

ip ospf 5 area 0

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:4::1/64

ipv6 ospf 5 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.10 255.255.255.252

ip ospf 5 area 0

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:3::2/64

ipv6 ospf 5 area 0

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router ospf 5

router-id 3.3.3.3

redistribute bgp 2 subnets

network 10.1.1.8 0.0.0.3 area 0

network 10.1.1.12 0.0.0.3 area 0

router bgp 2

bgp router-id 3.3.3.3

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.9 remote-as 1

neighbor 10.1.1.14 remote-as 2

neighbor 10.1.1.18 remote-as 2

neighbor 2001:DB8:ACAD:3::1 remote-as 1

neighbor 2001:DB8:ACAD:4::2 remote-as 2

neighbor 2001:DB8:ACAD:5::2 remote-as 2

address-family ipv4

network 10.1.1.8

network 10.1.1.12

redistribute ospf 5

neighbor 10.1.1.9 activate

neighbor 10.1.1.14 activate

neighbor 10.1.1.18 activate

neighbor 10.1.1.18 next-hop-self

exit-address-family

address-family ipv6

redistribute ospf 5

network 2001:DB8:ACAD:3::/64

network 2001:DB8:ACAD:4::/64

neighbor 2001:DB8:ACAD:3::1 activate

neighbor 2001:DB8:ACAD:4::2 activate

neighbor 2001:DB8:ACAD:5::2 activate

neighbor 2001:DB8:ACAD:5::2 next-hop-self

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 5

router-id 3.3.3.3

redistribute bgp 2 metric 10000

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

B 10.1.1.4/30 [20/0] via 10.1.1.9, 00:58:01

C 10.1.1.8/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.10/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.12/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.13/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.16/30 [110/2] via 10.1.1.14, 00:52:45, GigabitEthernet0/0/0

O 10.1.1.20/30 [110/3] via 10.1.1.14, 00:49:56, GigabitEthernet0/0/0

O E2 10.1.1.24/30 [110/1] via 10.1.1.14, 00:48:33, GigabitEthernet0/0/0

IPv6 Routing Table - default - 9 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

B 2001:DB8:ACAD:2::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:3::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:3::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:4::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:4::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:5::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

O 2001:DB8:ACAD:6::/64 [110/3]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:7::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

hostname R4

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

vtp domain cisco

vtp mode transparent

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO214420G3

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface GigabitEthernet0/0/0

ip address 10.1.1.17 255.255.255.252

ip ospf 5 area 0

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:5::1/64

ipv6 ospf 5 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.14 255.255.255.252

ip ospf 5 area 0

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:4::2/64

ipv6 ospf 5 area 0

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router ospf 5

router-id 4.4.4.4

redistribute bgp 2 subnets

network 10.1.1.12 0.0.0.3 area 0

network 10.1.1.16 0.0.0.3 area 0

router bgp 2

bgp router-id 4.4.4.4

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.13 remote-as 2

neighbor 10.1.1.18 remote-as 2

address-family ipv4

network 10.1.1.12

network 10.1.1.16

redistribute ospf 5

neighbor 10.1.1.13 activate

neighbor 10.1.1.18 activate

exit-address-family

address-family ipv6

redistribute ospf 5

network 2001:DB8:ACAD:4::/64

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 5

router-id 4.4.4.4

redistribute bgp 2

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

O E2 10.1.1.4/30 [110/1] via 10.1.1.13, 01:00:51, GigabitEthernet0/0/1

O 10.1.1.8/30 [110/2] via 10.1.1.13, 01:01:18, GigabitEthernet0/0/1

C 10.1.1.12/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.14/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.16/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.17/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.20/30 [110/2] via 10.1.1.18, 00:52:46, GigabitEthernet0/0/0

O E2 10.1.1.24/30 [110/1] via 10.1.1.18, 00:51:24, GigabitEthernet0/0/0

IPv6 Routing Table - default - 9 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

OE2 2001:DB8:ACAD:2::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:3::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:4::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:4::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:5::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:5::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:6::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:7::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

hostname R5

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

subscriber templating

ipv6 unicast-routing

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-3458782570

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-3458782570

revocation-check none

rsakeypair TP-self-signed-3458782570

crypto pki certificate chain TP-self-signed-3458782570

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 33343538 37383235 3730301E 170D3232 31313135 31363138

30345A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D33 34353837

38323537 30308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 0100CBC8 3C850482 ECE33ECF BE1E0A04 73770D79 57F1CF28 D6E72251

F6E142BE D3DDC583 D09A4AF7 0835DEAA 4B74BF0D 93642B22 D8BC75A3 46C78CAF

C23030C9 2BFD073A DAF3445A 5EC0E464 F18032B6 10468A29 AC067DDD CE4330C3

7D7D57AB 388C18B7 36E1029D D7A005F6 586A6325 56FE3D5A 6E53067A CCEB9034

156E49F5 A3033A3B FC78B945 A5F4761E 9963D23A BFB9204A AA03979E 3713F7BF

3A2D6E10 3A42C0C0 C4512090 DF4826FC 86D22871 D2210898 C5CAF8A0 E275B50D

F0949C8D B85315DF F9A7FFEF C4BF37F4 128308F1 A94CB8EE 470055DB 254CE0B0

AF549501 0CF60D7D 292BA3D5 99708572 BFA613E3 85893F46 A59C5C27 4CF6FDAA

763C75AE 41690203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 1475E0FC B3D76232 35617643 7A6C0F7C 4AC5D1A0

15301D06 03551D0E 04160414 75E0FCB3 D7623235 6176437A 6C0F7C4A C5D1A015

300D0609 2A864886 F70D0101 05050003 82010100 AFC953DB 7947DBC2 880A8D42

4C614654 4F094F0C 01DF92DC D9AB8EDB E9D9A3D5 5E585847 1DCC183A C6F63753

DA3E0EE6 52665DDC 1A559D78 8A74AE08 00016026 C43BCD0E D12FFAE9 568162B9

2DE9E9FA 8EAAF5D3 5C4B07F3 F453908A FA908019 4D14C069 A4D87A88 DED48CD8

AF0F955C 8CE94336 7D9FB371 F6752FD0 EC069408 28B71576 F5E93A62 AFE1FD59

C8BD4114 E39F289D 1CE9AD6F C890A8E9 F181D18C B72A799A AEC88DF1 05AB8AEF

F15322FA D68A05B0 D38EFA0E 088DB4BE 8B78E3B6 8679CFE8 813124FB 7DCE6CA6

0A0A8321 8BFED47B 78178BAC DCB8CFC1 07A35A13 C6BE2E98 224D1D4C 7D2767DD

1F3B2A93 25CB3561 5292E4A4 5AD30170 1320D11B

quit

license udi pid ISR4321/K9 sn FLM240800D6

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface GigabitEthernet0/0/0

ip address 10.1.1.21 255.255.255.252

ip ospf 5 area 0

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:6::1/64

ipv6 ospf 5 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.18 255.255.255.252

ip ospf 5 area 0

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:5::2/64

ipv6 ospf 5 area 0

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router ospf 5

router-id 5.5.5.5

redistribute bgp 2 subnets

network 10.1.1.16 0.0.0.3 area 0

network 10.1.1.20 0.0.0.3 area 0

router bgp 2

bgp router-id 5.5.5.5

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.13 remote-as 2

neighbor 10.1.1.17 remote-as 2

neighbor 10.1.1.22 remote-as 3

neighbor 2001:DB8:ACAD:4::1 remote-as 2

neighbor 2001:DB8:ACAD:5::1 remote-as 2

neighbor 2001:DB8:ACAD:6::2 remote-as 3

address-family ipv4

network 10.1.1.20

redistribute ospf 5

neighbor 10.1.1.13 activate

neighbor 10.1.1.13 next-hop-self

neighbor 10.1.1.17 activate

neighbor 10.1.1.22 activate

exit-address-family

address-family ipv6

redistribute ospf 5

network 2001:DB8:ACAD:5::/64

network 2001:DB8:ACAD:6::/64

network 2001:DB8:ACAD:7::/64

neighbor 2001:DB8:ACAD:4::1 activate

neighbor 2001:DB8:ACAD:4::1 next-hop-self

neighbor 2001:DB8:ACAD:5::1 activate

neighbor 2001:DB8:ACAD:6::2 activate

exit-address-family

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 5

router-id 5.5.5.5

redistribute bgp 2 metric 10000

control-plane

line con 0

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

O E2 10.1.1.4/30 [110/1] via 10.1.1.17, 00:58:18, GigabitEthernet0/0/1

O 10.1.1.8/30 [110/3] via 10.1.1.17, 00:58:18, GigabitEthernet0/0/1

O 10.1.1.12/30 [110/2] via 10.1.1.17, 00:58:18, GigabitEthernet0/0/1

C 10.1.1.16/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.18/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.20/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.21/32 is directly connected, GigabitEthernet0/0/0

B 10.1.1.24/30 [20/0] via 10.1.1.22, 00:54:02

IPv6 Routing Table - default - 9 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

OE2 2001:DB8:ACAD:2::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:3::/64 [110/3]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:4::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:5::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:5::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:6::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:6::1/128 [0/0]

via GigabitEthernet0/0/0, receive

B 2001:DB8:ACAD:7::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

BGP neighbor is 10.1.1.13, remote AS 2, internal link

BGP version 4, remote router ID 3.3.3.3

BGP state = Established, up for 01:03:17

Last read 00:00:45, last write 00:00:29, hold time is 180, keepalive interval is 60 seconds

Neighbor sessions:

1 active, is not multisession capable (disabled)

Neighbor capabilities:

Route refresh: advertised and received(new)

Four-octets ASN Capability: advertised and received

Address family IPv4 Unicast: advertised and received

Enhanced Refresh Capability: advertised and received

Multisession Capability:

Stateful switchover support enabled: NO for session 1

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 1 1

Notifications: 0 0

Updates: 9 11

Keepalives: 67 67

Route Refresh: 0 0

Total: 77 79

Do log neighbor state changes (via global configuration)

Default minimum time between advertisement runs is 0 seconds

For address family: IPv4 Unicast

Session: 10.1.1.13

BGP table version 18, neighbor version 18/0

Output queue size : 0

Index 2, Advertise bit 1

2 update-group member

NEXT\_HOP is always this router for eBGP paths

Slow-peer detection is disabled

Slow-peer split-update-group dynamic is disabled

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 5 5 (Consumes 680 bytes)

Prefixes Total: 7 8

Implicit Withdraw: 0 0

Explicit Withdraw: 2 3

Used as bestpath: n/a 1

Used as multipath: n/a 0

Used as secondary: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

Bestpath from this peer: 6 n/a

Total: 6 0

Number of NLRIs in the update sent: max 2, min 0

Last detected as dynamic slow peer: never

Dynamic slow peer recovered: never

Refresh Epoch: 1

Last Sent Refresh Start-of-rib: never

Last Sent Refresh End-of-rib: never

Last Received Refresh Start-of-rib: never

Last Received Refresh End-of-rib: never

Sent Rcvd

Refresh activity: ---- ----

Refresh Start-of-RIB 0 0

Refresh End-of-RIB 0 0

Address tracking is enabled, the RIB does have a route to 10.1.1.13

Route to peer address reachability Up: 1; Down: 0

Last notification 01:03:25

Connections established 1; dropped 0

Last reset never

Interface associated: (none) (peering address NOT in same link)

Transport(tcp) path-mtu-discovery is enabled

Graceful-Restart is disabled

SSO is disabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Mininum incoming TTL 0, Outgoing TTL 255

Local host: 10.1.1.18, Local port: 179

Foreign host: 10.1.1.13, Foreign port: 25421

Connection tableid (VRF): 0

Maximum output segment queue size: 50

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0x715686):

Timer Starts Wakeups Next

Retrans 73 0 0x0

TimeWait 0 0 0x0

AckHold 76 73 0x0

SendWnd 0 0 0x0

KeepAlive 0 0 0x0

GiveUp 0 0 0x0

PmtuAger 0 0 0x0

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 2225941951 snduna: 2225943714 sndnxt: 2225943714

irs: 2624824709 rcvnxt: 2624826581

sndwnd: 16099 scale: 0 maxrcvwnd: 16384

rcvwnd: 15985 scale: 0 delrcvwnd: 399

SRTT: 1000 ms, RTTO: 1003 ms, RTV: 3 ms, KRTT: 0 ms

minRTT: 0 ms, maxRTT: 1000 ms, ACK hold: 200 ms

uptime: 3805784 ms, Sent idletime: 1881 ms, Receive idletime: 2081 ms

Status Flags: passive open, gen tcbs

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 151 (out of order: 0), with data: 77, total data bytes: 1871

Sent: 151 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 74, total data bytes: 1762

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

TCP Semaphore 0x7F635EF92790 FREE

BGP neighbor is 10.1.1.17, remote AS 2, internal link

BGP version 4, remote router ID 4.4.4.4

BGP state = Established, up for 01:04:11

Last read 00:00:16, last write 00:00:12, hold time is 180, keepalive interval is 60 seconds

Neighbor sessions:

1 active, is not multisession capable (disabled)

Neighbor capabilities:

Route refresh: advertised and received(new)

Four-octets ASN Capability: advertised and received

Address family IPv4 Unicast: advertised and received

Enhanced Refresh Capability: advertised and received

Multisession Capability:

Stateful switchover support enabled: NO for session 1

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 1 1

Notifications: 0 0

Updates: 9 6

Keepalives: 69 70

Route Refresh: 0 0

Total: 79 79

Do log neighbor state changes (via global configuration)

Default minimum time between advertisement runs is 0 seconds

For address family: IPv4 Unicast

Session: 10.1.1.17

BGP table version 18, neighbor version 18/0

Output queue size : 0

Index 1, Advertise bit 0

1 update-group member

Slow-peer detection is disabled

Slow-peer split-update-group dynamic is disabled

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 5 3 (Consumes 408 bytes)

Prefixes Total: 7 3

Implicit Withdraw: 0 0

Explicit Withdraw: 2 0

Used as bestpath: n/a 0

Used as multipath: n/a 0

Used as secondary: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

NEXT\_HOP is us: n/a 2

Bestpath from iBGP peer: 6 n/a

Total: 6 2

Number of NLRIs in the update sent: max 2, min 0

Last detected as dynamic slow peer: never

Dynamic slow peer recovered: never

Refresh Epoch: 2

Last Sent Refresh Start-of-rib: never

Last Sent Refresh End-of-rib: never

Last Received Refresh Start-of-rib: 01:04:13

Last Received Refresh End-of-rib: 01:04:13

Refresh-In took 0 seconds

Sent Rcvd

Refresh activity: ---- ----

Refresh Start-of-RIB 0 1

Refresh End-of-RIB 0 1

Address tracking is enabled, the RIB does have a route to 10.1.1.17

Route to peer address reachability Up: 1; Down: 0

Last notification 01:04:18

Connections established 1; dropped 0

Last reset never

Interface associated: (none) (peering address in same link)

Transport(tcp) path-mtu-discovery is enabled

Graceful-Restart is disabled

SSO is disabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Mininum incoming TTL 0, Outgoing TTL 255

Local host: 10.1.1.18, Local port: 43082

Foreign host: 10.1.1.17, Foreign port: 179

Connection tableid (VRF): 0

Maximum output segment queue size: 50

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0x717206):

Timer Starts Wakeups Next

Retrans 75 0 0x0

TimeWait 0 0 0x0

AckHold 74 69 0x0

SendWnd 0 0 0x0

KeepAlive 0 0 0x0

GiveUp 0 0 0x0

PmtuAger 2988 2987 0x71729A

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 1968827114 snduna: 1968828915 sndnxt: 1968828915

irs: 1019037444 rcvnxt: 1019039158

sndwnd: 16061 scale: 0 maxrcvwnd: 16384

rcvwnd: 16137 scale: 0 delrcvwnd: 247

SRTT: 1000 ms, RTTO: 1003 ms, RTV: 3 ms, KRTT: 0 ms

minRTT: 1 ms, maxRTT: 1000 ms, ACK hold: 200 ms

uptime: 3857336 ms, Sent idletime: 18068 ms, Receive idletime: 17867 ms

Status Flags: active open

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 150 (out of order: 0), with data: 76, total data bytes: 1713

Sent: 151 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 76, total data bytes: 1800

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

TCP Semaphore 0x7F635EF92A00 FREE

BGP neighbor is 10.1.1.22, remote AS 3, external link

BGP version 4, remote router ID 6.6.6.6

BGP state = Established, up for 01:00:45

Last read 00:00:37, last write 00:00:11, hold time is 180, keepalive interval is 60 seconds

Neighbor sessions:

1 active, is not multisession capable (disabled)

Neighbor capabilities:

Route refresh: advertised and received(new)

Four-octets ASN Capability: advertised and received

Address family IPv4 Unicast: advertised and received

Enhanced Refresh Capability: advertised and received

Multisession Capability:

Stateful switchover support enabled: NO for session 1

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 1 1

Notifications: 0 0

Updates: 9 4

Keepalives: 67 67

Route Refresh: 0 0

Total: 77 72

Do log neighbor state changes (via global configuration)

Default minimum time between advertisement runs is 30 seconds

For address family: IPv4 Unicast

Session: 10.1.1.22

BGP table version 18, neighbor version 18/0

Output queue size : 0

Index 3, Advertise bit 2

3 update-group member

Slow-peer detection is disabled

Slow-peer split-update-group dynamic is disabled

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 5 2 (Consumes 272 bytes)

Prefixes Total: 7 3

Implicit Withdraw: 0 0

Explicit Withdraw: 2 1

Used as bestpath: n/a 1

Used as multipath: n/a 0

Used as secondary: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

Bestpath from this peer: 2 n/a

Total: 2 0

Number of NLRIs in the update sent: max 2, min 0

Last detected as dynamic slow peer: never

Dynamic slow peer recovered: never

Refresh Epoch: 1

Last Sent Refresh Start-of-rib: never

Last Sent Refresh End-of-rib: never

Last Received Refresh Start-of-rib: never

Last Received Refresh End-of-rib: never

Sent Rcvd

Refresh activity: ---- ----

Refresh Start-of-RIB 0 0

Refresh End-of-RIB 0 0

Address tracking is enabled, the RIB does have a route to 10.1.1.22

Route to peer address reachability Up: 3; Down: 2

Last notification 01:00:53

Connections established 1; dropped 0

Last reset never

External BGP neighbor configured for connected checks (single-hop no-disable-connected-check)

Interface associated: GigabitEthernet0/0/0 (peering address in same link)

Transport(tcp) path-mtu-discovery is enabled

Graceful-Restart is disabled

SSO is disabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Mininum incoming TTL 0, Outgoing TTL 1

Local host: 10.1.1.21, Local port: 179

Foreign host: 10.1.1.22, Foreign port: 47509

Connection tableid (VRF): 0

Maximum output segment queue size: 50

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0x719667):

Timer Starts Wakeups Next

Retrans 72 0 0x0

TimeWait 0 0 0x0

AckHold 70 66 0x0

SendWnd 0 0 0x0

KeepAlive 0 0 0x0

GiveUp 0 0 0x0

PmtuAger 0 0 0x0

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 1235327012 snduna: 1235328748 sndnxt: 1235328748

irs: 3557575329 rcvnxt: 3557576826

sndwnd: 16118 scale: 0 maxrcvwnd: 16384

rcvwnd: 16365 scale: 0 delrcvwnd: 19

SRTT: 1000 ms, RTTO: 1003 ms, RTV: 3 ms, KRTT: 0 ms

minRTT: 1 ms, maxRTT: 1000 ms, ACK hold: 200 ms

uptime: 3653951 ms, Sent idletime: 19397 ms, Receive idletime: 19195 ms

Status Flags: passive open, gen tcbs

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 144 (out of order: 0), with data: 71, total data bytes: 1496

Sent: 143 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 73, total data bytes: 1735

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

TCP Semaphore 0x7F635EF926C0 FREE

hostname R6

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

subscriber templating

ipv6 unicast-routing

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-3632327409

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-3632327409

revocation-check none

rsakeypair TP-self-signed-3632327409

crypto pki certificate chain TP-self-signed-3632327409

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 33363332 33323734 3039301E 170D3232 31313135 31363138

32395A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D33 36333233

32373430 39308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 0100A4CB 8A2B78E6 C1B7BF3E AC297B88 CAC8EB96 7A018978 A07668D1

70182F58 0E226B1E 0EEBE87B F6E33809 6A60737C A2D5C40D 873F718D 8BA6638E

A2931BCE 1F778FE3 CC61C2D3 AAB83576 41956711 D3500CA7 6E08B563 6366E749

0B3ED6E9 DD38B9E4 1F59F784 322A5320 5F8F9666 521035C1 D6F5993F 7C540E79

C8E8BC92 FAAE9D03 C3734343 70D9337A E7C5706A 07C33D56 3D4E3F48 6E9E5AE1

EBA45053 C7AD7F77 EB70CC6C 171DAFF1 A4657441 462486E3 83CEAAB5 063DF880

10E1D9D6 73AD063A 0410A9C9 5D57A8F8 EE1CA44B 96D8373F F9B567AD BE822DF7

5AEAB01C 448265DA E892F283 F3D5F7C3 7100E1AD 3E0E5341 E0C338F5 13943300

C30C2794 1CA70203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14E0D43D C1D4FD17 D8B2D709 12FA2121 6CDA6AB2

EA301D06 03551D0E 04160414 E0D43DC1 D4FD17D8 B2D70912 FA21216C DA6AB2EA

300D0609 2A864886 F70D0101 05050003 82010100 2A616DA9 0911AB69 DBD7B729

A70AD484 A843E17B AD0C99BD E96F5B23 261B0250 24109C0F 41CF50B2 F8A7C21D

1875A3EE 7E55A019 DD6BBCFC 32DEF553 08579C77 C46E4B42 FF7DC121 D24A07E7

1346D68E 1325E35B 9B394BF4 5FB9DA91 C8419EAC D6234BAD 95755455 9BD8AE60

6DF3AFE3 D722DC44 4BC08350 091B3051 753CD3E1 78FBBE86 35E8ED1A 8CC97470

0F793281 BD934366 94517219 C5D6D793 AA5131DC 906A440B 4E5495DB 43B6C529

B82C4EED DE507D32 4081BD91 E47AAC14 1CFBAD0C B84364D7 D1B0335E 717EBE6D

1013491E 51294A2D 7D01DE7E DDB023A7 87DAF7C3 957E56BA F7396B61 7DF17FCC

B60CF621 7BC76F99 E8F4CCFA 844E9E64 E2F1539F

quit

license udi pid ISR4321/K9 sn FLM240607Q1

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface Loopback0

no ip address

interface GigabitEthernet0/0/0

ip address 10.1.1.25 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:7::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.22 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:6::2/64

ipv6 eigrp 10

interface GigabitEthernet0/1/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/1/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router eigrp 10

network 10.1.1.20 0.0.0.3

network 10.1.1.24 0.0.0.3

network 10.1.1.28 0.0.0.3

redistribute bgp 3 metric 10000 100 255 1 1500

eigrp router-id 6.6.6.6

router ospf 5

router-id 6.6.6.6

router bgp 3

bgp router-id 6.6.6.6

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.21 remote-as 2

neighbor 2001:DB8:ACAD:6::1 remote-as 2

address-family ipv4

network 10.1.1.20

redistribute eigrp 10

neighbor 10.1.1.21 activate

exit-address-family

address-family ipv6

redistribute eigrp 10

network 2001:DB8:ACAD:6::/64

network 2001:DB8:ACAD:7::/64

neighbor 2001:DB8:ACAD:6::1 activate

exit-address-family

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 6.6.6.6

redistribute bgp 3 metric 10000 100 255 1 1500

ipv6 router ospf 5

control-plane

line con 0

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

B 10.1.1.4/30 [20/0] via 10.1.1.21, 01:05:15

B 10.1.1.8/30 [20/3] via 10.1.1.21, 01:05:15

B 10.1.1.12/30 [20/2] via 10.1.1.21, 01:05:15

B 10.1.1.16/30 [20/0] via 10.1.1.21, 01:05:15

C 10.1.1.20/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.22/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.24/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.25/32 is directly connected, GigabitEthernet0/0/0

IPv6 Routing Table - default - 9 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

B 2001:DB8:ACAD:2::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:3::/64 [20/3]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:4::/64 [20/2]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:5::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:6::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:6::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:7::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:7::1/128 [0/0]

via GigabitEthernet0/0/0, receive

L FF00::/8 [0/0]

via Null0, receive

hostname R7

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO21281AAT

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface GigabitEthernet0/0/0

no ip address

negotiation auto

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.26 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:7::2/64

ipv6 eigrp 10

interface GigabitEthernet0/1/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/1/1

no ip address

shutdown

negotiation auto

interface Service-Engine0/2/0

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router eigrp 10

network 10.1.1.20 0.0.0.3

network 10.1.1.24 0.0.0.3

eigrp router-id 7.7.7.7

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 7.7.7.7

redistribute bgp 3 metric 10000 100 255 1 1500

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, \* - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

D EX 10.1.1.4/30

[170/281856] via 10.1.1.25, 01:00:48, GigabitEthernet0/0/1

D EX 10.1.1.8/30

[170/281856] via 10.1.1.25, 01:00:48, GigabitEthernet0/0/1

D EX 10.1.1.12/30

[170/281856] via 10.1.1.25, 01:00:48, GigabitEthernet0/0/1

D EX 10.1.1.16/30

[170/281856] via 10.1.1.25, 01:00:48, GigabitEthernet0/0/1

D 10.1.1.20/30 [90/3072] via 10.1.1.25, 01:06:41, GigabitEthernet0/0/1

C 10.1.1.24/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.26/32 is directly connected, GigabitEthernet0/0/1

IPv6 Routing Table - default - 8 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, a - Application

EX 2001:DB8:ACAD:2::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:3::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:4::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:5::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

D 2001:DB8:ACAD:6::/64 [90/3072]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:7::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:7::2/128 [0/0]

via GigabitEthernet0/0/1, receive

L FF00::/8 [0/0]

via Null0, receive

Problems – since our group was 3 people and a rack only has two ports we had to find a very large cord and plug in from the next rack over, which delayed us slightly in starting the lab. Secondly we were having some trouble with the redistribute commands and getting the correct routes to show. The third thing that our group was running into some trouble with was setting up a full mesh topology which is a necessary part of an IBGP configuration.

Conclusion – In this lab we set up IBGP, which stands for internal border gateway protocol. In total we used seven routers and had to connect two different racks together to complete this lab. I learned that you can use any rack in the room partnered with any pc as long as you have a long enough cable. We also leaned how to configure a seventh router for this lab, which is the first time I’ve ever done a lab involving 7 routers. Overall we learned how to set up IBGP on a seven router config and how to manipulate and manage the configuration.